

## Complete Summary

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### GUIDELINE TITLE

Lower extremity musculoskeletal disorders. A guide to diagnosis and treatment.

### BIBLIOGRAPHIC SOURCE(S)

Brigham and Women's Hospital. Lower extremity musculoskeletal disorders. A guide to diagnosis and treatment. Boston (MA): Brigham and Women's Hospital; 2003. 11 p. [12 references]

## COMPLETE SUMMARY CONTENT

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 INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT  
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## SCOPE

### DISEASE/CONDITION(S)

Lower extremity musculoskeletal disorders, including:

- Knee pain (osteoarthritis of the knee, ligamentous injury, meniscal tear, anserine bursitis, or patellofemoral syndrome)
- Hip pain (osteoarthritis, trochanteric bursitis, iliotibial band syndrome)
- Ankle pain (acute ankle sprains, tendinitis, Achilles tendinitis, Achilles tendon rupture)
- Foot pain (plantar fasciitis, stress fractures, Morton's neuroma, hammer toes, hallux valgus, osteoarthritis, gout)

### GUIDELINE CATEGORY

Diagnosis  
 Treatment

### CLINICAL SPECIALTY

Family Practice  
Internal Medicine  
Orthopedic Surgery  
Physical Medicine and Rehabilitation  
Podiatry  
Sports Medicine

## INTENDED USERS

Advanced Practice Nurses  
Health Care Providers  
Occupational Therapists  
Physical Therapists  
Physician Assistants  
Physicians  
Podiatrists

## GUIDELINE OBJECTIVE(S)

To provide physicians with a clear approach to the diagnosis and treatment of certain musculoskeletal disorders

## TARGET POPULATION

Women with lower extremity musculoskeletal pain or dysfunction

## INTERVENTIONS AND PRACTICES CONSIDERED

### Diagnosis

1. Evaluation of patient's physical presentation of symptoms and history of previous pain or injury
2. Physical examination (joint, ligament, or tendon palpation, range of motion, Lachman's test, McMurray test, anterior drawer testing)
3. Diagnostic testing (radiography, magnetic resonance imaging [MRI])

### Treatment/Management

1. Exercise (aerobic conditioning and muscle strengthening exercises, range of motion exercises, stretching)
2. Gait training
3. Orthotic devices (braces, splints, immobilizers, pneumatic boot, arch supports, cast boots)
4. Heat/cold therapy
5. Compression
6. Proper shoe wear
7. Ultrasound
8. Cross-friction massage
9. Iontophoresis
10. Avoidance of aggravating activities
11. Weight control or weight loss management

12. Medications (acetaminophen, nonsteroidal anti-inflammatory drugs [NSAIDs], cyclooxygenase (COX)-2 inhibitors, glucocorticoid injections, colchicine)
13. Patient education
14. Self-management programs
15. Dietary supplements (glucosamine, chondroitin)
16. Surgery (total joint replacement surgery; osteotomy, arthroscopic surgery, bursectomy, repairs to ligaments or tendons, removal of neuroma)
17. Referral to specialists or subspecialists

#### MAJOR OUTCOMES CONSIDERED

Efficacy of treatment interventions on pain, frequency of physician visits, physical activity and overall quality of life

### METHODOLOGY

#### METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Secondary Sources)  
Searches of Electronic Databases

#### DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches using Medline.

#### NUMBER OF SOURCE DOCUMENTS

Not stated

#### METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Subjective Review

#### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

#### METHODS USED TO ANALYZE THE EVIDENCE

Review  
Review of Published Meta-Analyses

#### DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

#### METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

#### RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

#### COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

#### METHOD OF GUIDELINE VALIDATION

Peer Review

#### DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

These guidelines were reviewed by the Women's Health Guidelines Editorial Review Board.

### RECOMMENDATIONS

#### MAJOR RECOMMENDATIONS

##### Knee Pain

##### Osteoarthritis

##### Presentation

- Pain in and around the knee that usually worsens with weight bearing and improves with rest
- Morning stiffness can occur. Generally lasts less than 30 minutes
- Pain gets progressively worse over time.
- Occasionally swelling or sense of swelling with activity

##### Physical Exam

- Tenderness upon joint palpation, particularly medial joint line
- Bony enlargement, crepitus on motion, and/or limitation of joint motion

##### Diagnostic Testing

- Plain films demonstrate hallmarks of osteoarthritis - loss of joint space and/or osteophyte formation.
- Standing or PA Rosenberg (45 degrees of flexion with the patient standing) and patellofemoral views are useful.

##### Treatment

- Acetaminophen, up to 4,000 mg per day, is drug of choice. Non-steroidal anti-inflammatory drugs (NSAIDs) are second-line choices because of toxicity.
- Aerobic conditioning (walking, aquatic exercises) and quadriceps strengthening exercises have been shown to reduce pain and increase mobility.
- Weight reduction
- Gait training with appropriate devices if indicated
- Taping of the patella may help symptoms in the patellofemoral compartment.
- Lightweight knee braces may help with tibiofemoral symptoms.

#### Physical Therapy Recommendations

- Lower extremity flexibility and strengthening exercises
- Gait training as needed with the appropriate device
- Recommendations regarding shoe wear and/or shoe inserts to correct abnormal foot mechanics

#### Referral

- Referral to subspecialist for intra-articular corticosteroid injections may be appropriate for patients with effusion and local signs of inflammation.

#### Surgical Intervention

- Refer to an orthopedic surgeon if pain is severe or if patient failed above regimen.
- Osteotomy may provide relief and prevent progression in patients who have single compartment involvement.
- When appropriate, total joint replacement provides marked pain relief and functional improvement in the vast majority of patients.
- Unicompartmental replacement indicated in younger patients with osteoarthritis in one compartment.
- Total knee replacement (TKR) is underutilized in women. There are recent data showing that total knee replacement should not be a "last resort" and outcomes are superior when patients are operated upon at a less advanced point in functional decline.

#### Ligamentous Injury

##### Presentation

- Medial collateral ligament (MCL) injuries occur when lateral force is applied to the knee when the foot is planted.
- Swelling and tenderness on the medial side of the knee and ecchymosis may or may not occur.
- Anterior cruciate ligament (ACL) injuries result from activities involving deceleration force or jumping.
- With ACL injury, patients complain of a "giving way" sensation due to joint instability.
- Usually associated with hemarthrosis. ACL partially or completely torn in over 70% of hemarthroses.

- 40% of patients describe feeling a pop upon injury before the knee gives out.

#### Physical Exam

- MCL - The patient usually cannot extend the knee and lies with the knee slightly flexed. Some increase in varus (medial) laxity compared to the contralateral side, and applying a lateral stress to the knee at 25 to 30 degrees of flexion is painful.
- ACL - Lachman's test is the most sensitive test: with the patient supine, the knee is flexed 20 degrees. The examiner's upper hand grasps the outside of the distal thigh while the lower hand grasps the inside of the proximal tibial region and pulls anteriorly. The overall laxity is compared with the contralateral knee.

#### Diagnostic Testing

- X-rays to rule out occult fracture. If diagnosis is still unclear after examination, magnetic resonance imaging (MRI) can be useful. MRI is also useful to evaluate the menisci, chondral surfaces, ligaments, and bone for concomitant injury.

#### Treatment

- Ice
- Knee immobilizer
- Crutches to unload weight bearing across damaged ligament and promote good posture when upright
- NSAIDs
- Quadriceps sets, straight leg raising, and range of motion exercises
- MCL - Most cases require conservative treatment with short-term bracing.
- ACL - Older patients, who are often less affected by knee instability due to decreased activity levels, may be managed conservatively with hamstring and quadriceps strengthening exercises and bracing for vigorous activity. Surgery is sometimes indicated for more active patients.

#### Physical Therapy Recommendations

- Strengthening exercises especially quadriceps, hamstrings and hip adductors
- Gait training with appropriate device to unload weight bearing
- Patient education in activity modification, shoe wear, pacing and progression of weight bearing activities, and return to sports/leisure activities
- Progressive dynamic stabilization activities
- Exercises to restore flexibility

#### Referral

- MCL - Referral not necessary. Recovery takes up to 4 months. If mechanical symptoms (such as locking) persist, refer to orthopedics.
- ACL - Refer immediately.

#### Surgical Intervention

- MCL - Surgery rarely required.
- ACL - Surgical reconstruction of the ACL generally advised for active, athletic patients, or if instability persists.

## Meniscal Tear

### Presentation

- May or may not have history of trauma
- Pain localized to the joint line
- Clicking, sense of something loose
- Mechanical symptoms, locking
- Positional pain, especially at night
- Swelling

### Physical Exam

- Effusion is often present.
- Joint line tenderness
- Painful response to varus stress with knee in extension or at 30 degrees of flexion
- Pain on hyperflexion or hyperextension
- Pain with rotary testing
- Painful to duck walk
- McMurray test positive. Hold the joint lines with one hand and grip the tibia with the other, externally rotating and extending the knee. Painful click or pop in mid-extension is positive test (94% specificity, 24% sensitivity).

### Diagnostic Testing

- Clinical diagnosis
- X-ray for trauma history to rule out fracture
- MRI should be done in young patients or in patients with a history of trauma prior to referral to orthopedics.

### Treatment

- NSAIDs
- Ice
- Avoid aggravating activities (e.g., squatting).
- Non-weight bearing exercises or activities to prevent loss of range of motion and muscle strength
- Lightweight knee brace

### Physical Therapy

- Compressive ace bandage or neoprene soft orthotic to assist with edema and pain management
- Restoration of range of motion and muscle length
- Initiation of progressive quadriceps, hip adductor, and hamstring muscle strengthening

- Patient education in activity modification and progression
- Gait training with an assistive device may be indicated if gait is antalgic with weight bearing activities.

#### Referral

- In no history of trauma, refer if on-going mechanical symptoms are still present at 6 weeks.
- If young or history of trauma, obtain MRI and refer immediately.

#### Surgical Intervention

- Arthroscopic partial meniscectomy for ongoing mechanical symptoms
- Arthroscopic meniscal repair may be possible in young patients with peripheral tears.

#### Anserine Bursitis

##### Presentation

- Discomfort occurs mostly at night over the upper medial proximal tibia.
- Pain is often bilateral and may accompany panniculitis in obese, postmenopausal women.
- Knee osteoarthritis is also frequently present and may predispose to bursitis.
- Aggravation of pain by repetitive knee flexion, such as stair climbing, is a common complaint.

##### Physical Exam

- Point tenderness in area of anserine bursa (medial to tibial tubercle)
- Redness and warmth may be present.
- Localized swelling

##### Diagnostic Testing

- Clinical diagnosis - no diagnostic testing is indicated.

##### Treatment

- Treatment involves rest, NSAIDs, and steroid injection for persistent cases.

##### Physical Therapy

- Iontophoresis
- Stretching, especially hamstring and gastrocnemius muscles
- Strengthening, especially of hip adductors, quadriceps, and hamstrings
- Massage
- Gait training with appropriate device may be needed initially when tissue irritability is high.

## Referral

- Refer, or perform, steroid injection if no improvement with above treatment.

## Surgical Intervention

- Bursectomy is indicated in rare cases, as a last resort if all other treatments fail.

## Patellofemoral Syndrome

### Presentation

- Swelling, crepitus
- Anterior knee pain, aggravated by stairs (worse going downstairs), kneeling, standing from seated position, and running

### Physical Exam

- Pain with compressing patella onto the femur
- Common finding is pain on palpation of the undersurface of the medial facet of the patella.
- High Q angle ("knock knees")
- Lack of medial mobility of patella in extension

### Diagnostic Testing

- Skyline view knee films can be useful.

### Treatment

- For patients with excessive femoral anteversion and/or significant foot pronation, a flexible leather or semi-rigid orthotic with a one-eighth-inch medial heel wedge is used.

### Physical Therapy

- Pain relief modalities (iontophoresis, heat or cold); patient education regarding activity modification and independent exercises
- Patella mobilization and range-of-motion (ROM) activities
- Lower extremity muscle strengthening
- Taping of the knee
- Gait training and lower extremity stabilization activities
- Unloading knee orthotic may be needed.

## Referral

- If no response to treatment, refer to consider other diagnoses.

## Surgical Intervention

- Tibial tubercle osteotomy is indicated in rare cases.

## Hip Pain

### Osteoarthritis

#### Presentation

- Pain in the groin area, usually worsens with weight bearing and improves with rest. Lateral, flank, or buttock pain usually not "true" hip pain and suggests a different problem.
- May present as referred pain in the knee.
- Painful, limping gait
- Progressive loss of range of motion
- Crossing one's legs, tying shoes, and walking are painful.

#### Diagnostic Testing

- Differential diagnosis includes back pathology and trochanteric bursitis. Radiographic testing usually shows joint space narrowing in the superior lateral area of the hip. Spine films indicated when diagnosis is uncertain.

#### Physical Exam

- Decreased range of motion of the hip in flexion, adduction, and internal rotation.

#### Treatment

- Acetaminophen, up to 4,000 mg a day initial drug of choice
- NSAIDs are more effective, but they are a second-line therapy because of toxicity. Cyclooxygenase (COX)-2 inhibitors are associated with fewer gastrointestinal (GI) side effects than NSAIDs but they carry a risk of renal toxicity and are quite costly.

#### Rehabilitation (Physical or Occupational Therapy)

- Pain management techniques (positioning, posture cues, use of heat/cold for symptom management)
- Exercise program to maintain or improve joint range of motion and muscle strength
- Appropriate assistive device (e.g., cane) to improve ambulation

#### Referral

- Refer to surgery when patient feels the benefits of surgery outweigh the risks. For some this will be early in the process, to maintain active function, while for others this will be when pain is too severe to carry out activities of daily living.

#### Surgical Intervention

- Total hip replacement (THR) should be undertaken when the above measures have failed. Total hip replacement is underutilized in women, yet it is a very effective treatment for osteoarthritis of the hip with a less than 1% mortality. Results are best in centers that perform high numbers of the procedure.

## Trochanteric Bursitis

### Presentation

- May or may not have history of trauma/fall onto affected hip
- Pain is generally felt in the area of the posterior, lateral greater trochanter.
- Pain may also extend down the lateral thigh or occasionally into the buttocks.
- Patients complain that activities such as rising to a standing position, sleeping on affected side, and/or going up or down stairs cause increase in pain.

### Diagnostic Testing

- Clinical diagnosis

### Physical Exam

- Tenderness over the posterior lateral greater trochanter, especially when palpated with patient lying on unaffected side and downward pressure exerted over affected soft tissue

### Treatment

- NSAIDs are helpful for management of pain. Stretching program very helpful.

### Rehabilitation (Physical or Occupational Therapy)

- Modalities for pain management (iontophoresis, heat/cold)
- Patient education for activity modification, specific stretching techniques, and home exercises program
- Exercise program to restore joint range of motion, correct muscle imbalance, promote joint proprioception
- Gait training

### Referral

- Referral to subspecialist for corticosteroid injection may be helpful.

### Surgical Intervention

- Not indicated

## Iliotibial Band Syndrome

### Presentation

- Aching or burning pain over the lateral femoral condyle or proximal lateral tibia, and may radiate up the thigh toward the hip

#### Diagnostic Testing

- Clinical diagnosis

#### Physical Exam

- Pain on palpation of the iliotibial band (localized or along the entire band)

#### Treatment

- NSAIDs to reduce pain and inflammation
- Wearing proper shoes and advising patients to run on even terrain or softer surfaces
- Orthotics may help to improve alignment.

#### Rehabilitation (Physical or Occupational Therapy)

- Stretching exercises to restore flexibility
- Patient education on activity modifications and proper shoe wear
- Exercises to restore muscle strength and correct imbalances
- Orthotics may be needed.

#### Referral

- Referral to subspecialist for local corticosteroid injections into areas of tenderness may be helpful.

#### Surgical Intervention

- Not indicated.

### Ankle Pain

#### Acute Ankle Sprains

##### Etiology

- Result from stretching or tearing of ankle ligaments due to inversion or eversion foot injuries

##### Presentation

- Lateral side more commonly affected
- Lateral sprain: pain increases upon ankle inversion.
- Medial sprain: pain increases upon eversion.
- Swelling usually present

## Physical Examination

- Careful palpation will help to determine which part of the ligament is affected.
- Anterior drawer testing to assess for instability

## Diagnostic Testing

- Perform x-rays if there is:
  - Bone tenderness in posterior half of lower 2.5 inches of the fibula or tibia
  - Inability to bear weight immediately after the injury
  - Pain at the base of the fifth metatarsal

## Treatment

- Initial goals of treatment are to prevent swelling and maintain range of motion.
- Early management includes rest, ice, compression, and elevation.
- Although early motion and mobility are advised, strength may not return for months.
- Supportive stirrup or brace

## Physical Therapy Recommendations

- Achilles tendon stretching should begin 48 to 72 hours after ankle injury since tissues contract after trauma.
- Edema control with position, soft tissue massage and mobilization, compression
- Possible use of whirlpool or aquatic therapies. Initiate exercises for muscle strengthening and balance training.
- Gait training with appropriate device
- Orthotics - ankle or foot support as needed
- Patient education regarding shoe wear

## Referral

- Refer if bony injury on x-ray, severe swelling, persistent pain that makes weight-bearing difficult after the first 48 hours, or severe or chronic instability.

## Surgical Intervention

- Sprains with complete ligament tears or associated tendon injury may require surgery.

## Tendinitis (not including Achilles tendinitis)

## Etiology

- Most common tendinitis in the ankle is posterior tibial or peroneal tendonitis.
- Repetitive activity or an unaccustomed activity

- Ill-fitting footwear may cause injury to the extensor hallucis longus or posterior tibialis tendon.

#### Presentation

- Bulbous swelling often occurs distally on affected tendon.
- Posterior tibial tendon often involved when patient has a pronated flat foot. Pain over medial ankle and longitudinal arch with standing.

#### Physical Examination

- Tubular swelling of the tendon sheath, pain on passive stretching of the tendon and ankle movement
- Palpation of the ankle joint does not usually cause pain.
- Unable to stand on toes

#### Diagnostic Testing

- Clinical diagnosis
- Extent of the injury can be demonstrated on MRI.

#### Treatment

- Eliminate inciting factors (e.g., treadmill, stair exercises, jogging, step aerobics); wear sneakers; ice, elevation, stretches/strengthening; NSAIDs

#### Physical Therapy Recommendations

- Modalities for management of local inflammation (iontophoresis, heat or cold)
- Stretching and strengthening exercises
- Patient education re: activity modification and progressive dynamic activities, shoe wear, and home exercise program
- Gait training with use of appropriate devices; foot orthotics or pneumatic boot may be indicated.

#### Referral

- Refer after 3 to 4 weeks if no improvement.

#### Surgical Intervention

- Usually bracing, splinting adequate. Rarely, surgery is required.

#### Achilles Tendinitis

#### Etiology

- Running long distances, marked increases in pace, or excessive hill running. Most common type of tendinitis found in runners.

## Presentation

- Patients usually describe mild pain along tendon after exercise or running that gradually worsens.
- May also complain of morning tenderness about an inch and a half above the point where the Achilles tendon inserts into the calcaneus

## Physical Examination

- Dorsiflexion of the ankle increases the pain, and there is pain upon palpation of the tendon.
- There may also be soft tissue swelling, redness, and warmth on the adjacent retrocalcaneal bursa.

## Diagnostic Testing

- Clinical diagnosis

## Treatment

- Rest, avoidance of impact sports, corrective orthotics, such as heel lifts, and stretching exercises, particularly toe raises to strengthen the Achilles tendon, are usually sufficient. Achilles and hamstring stretches.
- Patients with retrocalcaneal bursitis, which is similar to Achilles tendinitis, may benefit from heel cups in the shoes.

## Physical Therapy Recommendations

- Stretches, strengthening, modalities, night splints

## Referral

- Referral to subspecialist after 6 to 8 weeks of conservative treatment for consideration of bracing or splinting. Note: steroid injection should not be done, because of risk of tendon rupture.

## Surgical Intervention

- Surgery usually not necessary

## Achilles Tendon Rupture

### Etiology

- Usually occurs in people over 30 who engage sporadically in sports and do not perform regular leg conditioning.

### Presentation:

- Patient often recalls an audible snap, followed by intense pain in the calf, as if it were struck by a blunt object.

#### Physical Examination

- Inability to stand on toes
- With the patient kneeling on a chair or lying prone on exam table with feet hanging over the edge, squeezing the calf muscle makes a normal foot plantar-flex, but foot with ruptured tendon will not respond.
- Ecchymosis, edema
- Palpable defect in tendon

#### Diagnostic Testing

- Clinical diagnosis (MRI not required)

#### Treatment

- Clinical diagnosis (MRI not required)

#### Physical Therapy Recommendations

- Extensive postoperative exercise to return to normal function is often needed (see below).

#### Referral

- Orthopedic consultation is always necessary, and patients should be referred immediately.

#### Surgical Intervention

- Surgery is usually recommended, and is best performed soon after the injury. The success of delayed surgery is less clear.

### Foot Pain

#### Plantar Fascitis

##### Etiology

- Usually caused by a tension along the plantar fascia
- Can be associated with obesity, flat feet
- Common among women who regularly perform aerobic exercise

##### Presentation

- Heel pain upon taking first few steps in the morning or on arising after prolonged sitting with symptoms often lessening as walking continues.
- Pain is localized to the medial plantar calcaneal tubercle.

- The pain is not usually the result of acute trauma, and many patients have lived with heel pain for years.

#### Diagnostic Testing

- Radiographs are only necessary if another abnormality, such as fracture, tumor, or rheumatoid arthritis, is suspected.

#### Treatment

- Medial arch support to decrease pronation while walking, if underlying alignment abnormality
- Achilles tendon/plantar fascia stretching exercises should be performed for 6 to 8 weeks before a follow-up evaluation.
- Night splints
- Ice packs on the plantar aspect of the heel for 15 to 20 minutes before bed for 10 to 14 days
- NSAIDs trial; may not be helpful

#### Physical Therapy Recommendations

- Stretches, strengthening, cross-friction massage; modalities as needed (iontophoresis for inflammation, ultrasound for deep heating)

#### Referral

- Refer if no better in four weeks, or if diagnosis is uncertain.

#### Surgical Intervention

- Surgery is extremely uncommon; only indicated for a few patients in whom prolonged conservative measures have failed.

#### Stress Fractures

##### Etiology

- Generally considered overuse injuries to bone and are caused by excessive walking and running on hard surfaces. May be first indication of osteoporosis or osteomalacia.

##### Presentation

- Pain that increases during exercise and subsides with rest. Pain is sharp and worsens with weight bearing; referred pain to distant sites may occur.
- Lower third of the tibia common, but also occur in the metatarsals, tarsals, fibula, and sesamoid bones of the foot.
- Point tenderness over the fracture site

##### Diagnostic Testing

- Radiographs are usually unremarkable in the first 2 weeks following the injury. After that, they may be used to confirm the diagnosis. If pain is severe or lasts longer than 10 days, an MRI should be considered to make the diagnosis. When stress fracture is suspected, treatment should be initiated, immediately and should not be delayed until the x-ray reveals the fracture.

#### Treatment

- Rest and substitution of gentler training, such as swimming, stretching, and strengthening for six weeks for mild cases. For more severe cases when walking is painful, crutches or walking cast/boot may be needed.
- Air cast boot is helpful in cases of metatarsal stress fracture.
- Consider bone density if stress fracture possibly related to underlying osteoporosis or osteopenia.

#### Physical Therapy Recommendations

- Not necessary-avoidance of impact exercise is sufficient.

#### Referral

- Refer to orthopedics early if diagnosis is in question. Otherwise, refer in four weeks if no improvement.

#### Surgical Intervention

- No surgical intervention necessary.

#### Morton's Neuroma

#### Etiology

- Entrapment neuropathy (not an actual tumor) that develops between the bases of the third and fourth toes on the plantar surface of the foot. There may also be involvement of other interdigital plantar nerves.

#### Presentation

- Numbness and tingling of the toes and aching and burning in the distal forefoot
- Pain usually radiates from the metatarsal heads to the third and fourth toes.
- Walking on hard surfaces or wearing tight or high-heeled shoes exacerbates pain.

#### Diagnostic Testing

- Clinical diagnosis

#### Treatment

- Shoe inserts to reduce stress at the metatarsal heads, placed in both shoes so that patient walks evenly
- Broad-toed shoe that allows spreading of the metatarsal heads often relieves pain. Low heel, stiff sole. Good sneakers are ideal.
- Avoid dress shoes.
- Avoid treadmill, stair machines, and impact sports.

#### Physical Therapy Recommendations

- Not necessary. Avoidance of dress shoes and impact sports is sufficient. Expensive orthotics (\$300-400) are often too hard, and not of benefit.

#### Referral

- Refer if pain persists beyond 3 to 4 weeks. Referral to subspecialist for corticosteroid injection can be beneficial.

#### Surgical Intervention

- Surgical removal of the neuroma and nerve is sometimes appropriate in those who are resistant to conservative therapy.

#### Hammer Toes

##### Etiology

- Contractures of flexor tendons of the toe causing abrasion against the shoe, with resultant calluses and corns
- Often develops in the second toe
- Worsened by narrow toe shoes
- May result from osteoarthritis or rheumatoid arthritis

##### Presentation

- Pain and crossing of first and second toes
- Difficulty finding shoes that fit
- Four times more common in women

##### Diagnostic Testing

- Clinical examination

##### Physical Therapy Recommendations

- No role. However, patients may use good silastic tubes to cover their hammertoes and prevent friction against shoes. Recommend appropriate shoe wear.

##### Treatment

- "Crest pad" made out of foam to slip over the toe, and protect skin
- Ice
- Orthotics may redistribute the weight and ease pressure on toe.

#### Referral

- Refer when shoe wear modification no longer helps to relieve the pain.

#### Surgical Intervention

- Tendon transfer only necessary in the most severe cases. For rigid hammertoes, part of the toe may need to be removed.

#### Bunions (Hallux valgus)

##### Etiology

- Inflammation and enlargement of the metatarsophalangeal (MTP) of the great toe. Affects 1 in 100 people.
- Usually caused by narrow-toe shoes (women affected 15 times more than men)

##### Presentation

- Patient may note a bump on the medial aspect of the foot, or may complain of pain in the MTP joint

##### Diagnostic Testing

- Clinical examination

##### Physical Therapy Recommendations

- Patients should be educated about good shoe wear. Soft bunion splint at night may relieve night time discomfort.

##### Treatment

- Recommend appropriate shoe wear to prevent progression.
- Use of a doughnut shaped pad over the MTP.
- Orthotics may prevent abrasion of the bunion against the shoe.

#### Referral

- Refer to orthopedics if no improvement with above measures

#### Surgical Intervention

- Metatarsal osteotomy (bunionectomy) indicated in severe cases.

## Osteoarthritis

### Etiology

- Wear and tear of the 33 joints of the foot
- Obesity and previous trauma are risk factors.

### Presentation

- Most commonly affected joint is the great toe MTP (hallux rigidus).
- Pain and stiffness in morning and at the end of the day
- Alleviation of pain with rest

### Diagnostic Testing

- X-ray

### Physical Therapy Recommendations

- No role for physical therapy. Recommend good supportive shoes or sneakers.

### Treatment

- Exercise maintains joint flexibility.
- NSAIDs

### Referral

- Refer when use of correct shoes no longer helpful and NSAID use becomes chronic.

### Surgical Intervention

- May be necessary in rare cases

## Gout

### Etiology

- Uric acid crystals in joints

### Presentation

- In the foot, most common joint is the first MTP.
- Redness, swelling, and pain in acute flares

### Diagnostic Testing

- For the first attack, consider aspiration. Uric acid crystals in the joint aspirate make the diagnosis.

- Tophi on x-ray in chronic cases

#### Physical Therapy Recommendations

- No role for physical therapy

#### Treatment

- NSAIDs (indomethacin 25 mg orally three times a day).
- Corticosteroids if patient cannot take NSAIDs
- Oral colchicine (side effects include nausea, vomiting, diarrhea in 80% of patients).

#### Referral

- For repeated attacks, or polyarticular gout, refer to rheumatologist.

#### Surgical Intervention

- Not indicated

#### Recommendations for Shoe Wear

Shoes should be wide enough to accommodate the foot width without crowding. There should be 1/4-inch space between the tips of the toes and the front of the shoe (toes should be able to wiggle). Low-heeled shoes are best, with no more than a 3/4-inch high heel, with wide, padded heels and an adequately wide toe box to avoid toe crowding. It is advisable for patients to measure their feet with each purchase of shoes.

#### CLINICAL ALGORITHM(S)

An algorithm is provided in the original guideline document for knee pain.

### EVIDENCE SUPPORTING THE RECOMMENDATIONS

#### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

The recommendations presented herein are based on a comprehensive assessment of recent literature on musculoskeletal conditions.

### BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

#### POTENTIAL BENEFITS

Overall Benefit

- Appropriate diagnosis and treatment of lower extremity musculoskeletal disorders in women

#### Specific Benefits

- According to a recent meta-analysis, participation in self-management programs for osteoarthritis (such as that offered by the Arthritis Foundation – [www.arthritis.org](http://www.arthritis.org)), can lead to decreased joint pain, reduced frequency of physician visits, increased physical activity, and overall improved quality of life.
- Some evidence indicates that glucosamine and chondroitin sulfate, which are sold as dietary supplements, may be helpful for pain relief in some patients with osteoarthritis, though there are no data to show that these supplements modify the underlying disease.
- Aerobic conditioning and quadriceps strengthening exercises have been shown to reduce knee pain and increase mobility.

#### POTENTIAL HARMS

- Side effects of medication. For example, side effects of oral colchicine include nausea, vomiting, and diarrhea in 80% of patients
- Complications of surgery. Total hip replacement for osteoarthritis of the hip results in less than 1% mortality.

### QUALIFYING STATEMENTS

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This guide is not intended to convey rigid standards. Instead, it should be tailored to the needs of the individual patient.

### IMPLEMENTATION OF THE GUIDELINE

#### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

### INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

#### IOM CARE NEED

Getting Better  
Living with Illness

#### IOM DOMAIN

Effectiveness  
Patient-centeredness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Brigham and Women's Hospital. Lower extremity musculoskeletal disorders. A guide to diagnosis and treatment. Boston (MA): Brigham and Women's Hospital; 2003. 11 p. [12 references]

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

2003

### GUIDELINE DEVELOPER(S)

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### SOURCE(S) OF FUNDING

Brigham and Women's Hospital

### GUIDELINE COMMITTEE

Not stated

### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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### FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

## GUIDELINE STATUS

This is the current release of the guideline.

## GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [Brigham and Women's Hospital Web site](#).

Print copies: Available from the Brigham and Women's Hospital, 75 Francis Street, Boston, Massachusetts 02115. Telephone: (800) BWH-9999.

## AVAILABILITY OF COMPANION DOCUMENTS

None available

## PATIENT RESOURCES

None available

## NGC STATUS

This NGC summary was completed by ECRI on May 5, 2004.

## COPYRIGHT STATEMENT

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